2016 UDOT RESEARCH PROBLEM STATEMENT

****** Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at tahales@utah.gov. ******

Title: Quantifying effects of spatial coverage and temporal frequency of transit service on ridership **No. (office use):** 16.06.05

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UDOT Champion (suggested): Hal Johnson

Select One Subject Area

- ☐ Materials/Pavements
- ☐ Maintenance
- ☐ Traffic Mgmt/Safety
- ☐ Preconstruction
- ☐ Planning
- ☒ Public Transportation

1. Describe the problem to be addressed.

Service is the largest proportion of transit agencies' operating budgets. Of this service, there are two components that roughly describe the total amount provided. These include spatial coverage and temporal frequency. Among other things, a transit agency's operating budget is a function of balancing these two critical components. Which, then, is more important when it comes to ridership? As the current standard in transit agency performance measurement, ridership is of the utmost concern to transit providers. With the goal of improving aggregate (system-wide) ridership, it is imperative to understand which of these key dimensions of service provision have greater effects on ridership.

2. Explain why this research is important.

Public transit can reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions through travel mode shifts from driving to transit occurring as result of transit investments. Research also suggests that the influences of transit go beyond that, including more compact and mixed land uses in station areas, a higher propensity by users to chain trips, reduced traffic congestion and a significantly higher rate of related non-motorized travel (walk and bike trips). These factors converge to reduce automobile travel and GHG emissions to a greater degree than simply the distance travelled via transit. Even those who live near transit but do not utilize it may drive less owing to the compact, mixed-use neighborhoods and opportunities to walk and bike fostered by transit.

Additionally, providing good transit service is a way to promote social equity. For people without access to private vehicle, like people cannot afford cars or people with disability, public transit may be their only choice of reaching jobs and other recourses.

3. List the research objective(s):

1. Measure transit ridership, spatial coverage, temporal frequency, and other control variables using the best national data available for U.S. urbanized areas.
2. Relate these variables to one another using structure equation modelling to determine whether spatial coverage or temporal frequency has greater effects on transit ridership.

4. List the major tasks:

1. Compile the best available data for U.S. urbanized areas to operationalize measurements. The data sources include but not limited to National Transit Database, FHWA Highway Statistics, US Census and American Community Survey, Oil Price Information Service.
2. Conduct cross-sectional and longitudinal analyses by structure equation modelling (SEM).
3. Draw conclusion from the analysis and write up methodology and results in a report and peer-reviewed article.

5. List the expected results:

1. Based on the literature to date, it is impossible to say whether spatial coverage or temporal frequency of transit service is more influencing in increasing transit ridership.
2. What we can be sure, of is that using the best available data and the proper statistical methods, we will be able to answer the research question with a degree of certainty. We can also be sure that this research will be of general interest of transit agencies both locally and nationally.

6. Describe how this research will be implemented.

It is the expressed role of transit agencies to provide the best and most convenient service to its customers. In order to achieve this goal most effectively, it is important that agencies understand how to most efficiently allocate their scarce resources. Operating costs represent the majority of transit agencies' budgets, and of that, service provision is the primary expense. Service provision can be broken down into two categories: the geographic extent of routes and the frequency of transit vehicle trips. Insight into the impacts of these two components on transit ridership will allow agencies to know how to reallocate resources to an equilibrium of frequency and coverage that best suites its customers, in turn improving ridership.

7. Requested from UDOT: $20,000 **Other/Matching Funds:** $20,000 **Total Cost:** $40,000
(or UTA for Public Transportation)

8. Outline the proposed schedule, including start and major event dates.

Project Start Date: June 1, 2016
Data Collection: June-October, 2016
Data Analysis: November-December, 2016
Report Writing: January-March , 2017
Project End Date: March 31, 2017